kn' denoting the corresponding value of δu. And eliminating M between this and the former equation, we find

$$p = \text{cotan } \theta \, (2 - 3 \sin^2 \phi) \, \frac{a^3}{e^3} \, \frac{n'}{n}.$$

"We must likewise have recourse to experiment, to determine the value of the coefficient S.* In fact we have seen that the quantity, Q, which enters into the expression of this coefficient, is the ratio of two series containing the integrals $\int r^3 dm$, $\int r^5 dm$, $\int r^7 dm$, &c., $\int \frac{dm'}{R^3}$, $\int \frac{dm'}{R^5}$, $\int \frac{dm'}{R^7}$, &c., the values of which, depending upon the distribution of free magnetism in the magnet and iron bar, cannot be known *a priori*.† We may, however, determine the value of the coefficient S by experimental means analogous to those already employed in the determination of p. We have seen, in fact, that when the deflecting magnet in that experiment was horizontal, and perpendicular to the magnetic meridian, there was

$$\frac{M}{a^3} = XS \, kn'.$$

Now, let the iron bar be removed, and, the deflecting magnet remaining in the same position, let kn'' denote the change of angle produced by its action. Then

$$\frac{M}{a^3} = X kn'';$$

and, dividing the equation last found by this,

$$S = \frac{n''}{n'}."$$

The President exhibited to the Academy a map of Ire-

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* "It is obvious that this necessity does not arise in the adjustment of the soft iron bars described in the commencement of this Paper."

† "We may approximate to these values, and therefore to the value of Q, on the assumption that the whole forces of the magnet and bar are concentred in two points, or poles."

land, on which the stations for meteorological and tidal observations were marked, so as to show their geographical distribution. And he availed himself of the opportunity to give a brief account (derived from these observations) of a cyclonic gale, accompanied with a sudden fall of the barometer and a corresponding rise of the tide, which was felt over the whole of Ireland on the 6th of last month.

The Rev. Samuel Haughton stated, in confirmation of the President's remarks, that the returns from the tidal stations showed an elevation of water varying from ten to eighteen inches above the mean height, corresponding to the period of greatest depression of the barometer. This depression would, however, only account for part of the elevation of water, the rest must be attributed to the force of the wind.

Mr. W. Hogan read an analysis of the meteorological observations communicated by Mr. G. Yeates, and published in the Proceedings.

"The violent and fatal epidemics, affecting both animal and vegetable life, which prevailed during the preceding seven years, may have been, and probably were, in some manner connected with the state of the atmosphere; and it has occurred to me that an examination of the state of the weather during that period might be interesting and possibly instructive.

"The quantity of rain which falls at any period, in this climate, is, in general, indicative of the state in which both the barometer and thermometer stood at the time. Bright skies and serene weather are in general accompanied by a higher mark both of the barometer and thermometer, and on the contrary the mark is lower in cloudy, damp weather. It has, therefore, occurred to me that a table showing the quantity of rain which fell in each month during those seven years would, for this climate, give a general view of the state of the atmosphere at the time. The Royal Irish Academy has published